

**CONSERVATION OF THE WHITEFISH PENINSULA:  
AN IMPORTANT LAND CORRIDOR FOR MIGRANT LANDBIRDS**

**FINAL REPORT**

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## INTRODUCTION

Whitefish Point, located in Chippewa County in the northeastern Upper Peninsula of Michigan, is known for its concentrations of migrating landbirds. The surrounding land and water features create a natural corridor, funneling birds directly to the Point as they travel through the Great Lakes Region. Migratory birds comprise the major proportion of the avian community in the Whitefish Point area for 5 - 6 months of the year. The Whitefish Point Bird Observatory (WPBO) has been monitoring the migration with seasonal counts and constant effort mist-netting since 1979.

Concern for neotropical migrants has increased due to apparent declines of some species (Morton and Greenberg 1989, Robbins et al 1989 and Terborgh 1989). Successful migration depends on the migrant's ability to replenish energy reserves, locate suitable stopover sites and travel routes, avoid predation and cross travel barriers quickly and safely (Moore and Simons 1989). Population stability of neotropical migrants is probably influenced by the availability of suitable habitat in migration (Hutto 1985).

About 20% of the land on the Whitefish Peninsula is privately owned, particularly along the lake shore, and is used for residential development and recreation or managed for timber. The remainder is owned by the State of Michigan (Lake Superior State Forest) and is managed for timber and wildlife production.

Both private and public land uses on the Whitefish Peninsula pose a threat to migratory birds by limiting or altering essential habitat. The Michigan Department of Natural Resources (MDNR) recognizes the corridor's significance to migrants. The MDNR desires information that will enable them to continue current land uses in a wise manner while insuring the protection of migratory bird habitat.

WPBO began to supply this information with its Peninsula Study in 1994 and 1995 (Johansen et al. 1995). The purpose of our 1996 study is to further document habitat associations, migration pathways, and stopover times of raptor and neotropical migrant bird species at Whitefish

Point and Vermilion. This information will be used to establish priorities for conservation and management of forest resources along the corridor.

## STUDY AREA

The study was conducted at the tip of Whitefish Point, Chippewa County, Michigan (46° 50' N, 85° 00' W) and Vermilion, 16 km west of Whitefish Point on the shore of Lake Superior (Figs. 1). The terrain at Whitefish Point is level and is comprised of mostly sand and rock. Jack pine (*Pinus banksiana*) is the dominant vegetation type. Northern white cedar (*Thuja occidentalis*), Eastern white pine (*Pinus strobus*), white spruce (*Picea glauca*), black spruce (*Picea mariana*), tag alder (*Alnus rugosa*) and trembling aspen (*Populus tremuloides*) are also present. About 15% of this site is comprised of ponds or wetlands.

The Vermilion study site is flat with a sand ridge along the edge of an open cranberry bog. The southern and eastern section of the study site is located in a tag alder swamp adjacent to a sedge meadow. The western edge of the study site consists of a mixed coniferous-deciduous forest with balsam fir (*Abies balsamea*), red maple (*Acer rubrum*) and white birch (*Betula papyrifera*) predominating. The northern edge of the site is a 150 m beach bordered on the north by Lake Superior.

## METHODS

### Whitefish Point:

Spring 1996 (15 March - 31 May) -

We ran the Director's Census from 15 March to 31 May. The census is run daily 2 hours after official sunrise (EST) and encompasses most habitat types found on the Point (Fig. 2). One observer completes the route in one hour and records all birds seen or heard. The census is not run on days with weather that would threaten the health of the counter, e.g., severe thunder storms.

WPBO's spring owl census was conducted from 1 April to 31 May. Fifteen mist-nets were run in the jack pine woods east of the parking area at the tip of the Point (Fig. 2). All nets were opened one half hour after sunset and closed one half hour after sunrise. Nets were checked at least every forty minutes and were not run on nights with strong winds or rain which could jeopardize the health of the birds. All nets in the spring were passive and set to capture owls as they searched for prey in the jack pine stands. Birds were not recorded again if they were captured more than once in the same night. Birds recaptured on a different night were recorded again and used to determine stopover times.

Fall 1996 (1 August - 13 November) -

Passerine banding was conducted from 1 August to 30 September. Birds were captured using 15, 30mm mesh mist-nets (Fig. 3). Nets were opened thirty minutes before official sunrise and ran for six hours. Nets were not opened, or closed early, on days with inclement weather (wind, rain, etc.) for the safety of the birds. A census was conducted at official sunrise and again after closing the nets to gather information on birds not captured in mist-nets. This is the same route used in the spring described above as the "Director's Census."

Recaptures were defined as birds banded at Whitefish Point or Vermilion in the fall of 1996 and recaptured at Whitefish Point within 59 days of the original capture date. Many individuals were recaptured more than once, and for the analysis the latest recapture date was used to calculate stopover time.

The owl census at Whitefish Point was resumed on 23 September and continued until 31 October. The fall census uses the same site as the spring and also uses 15 mist-nets (Fig. 3). In the fall we use audio luring sites and passive sites. The same methods are used in the fall as were used in the spring regarding netting hours and weather closures. Boreal owl and Northern saw-whet owl calls on a cassette tape were broadcasted at the audio sites using a tape player connected to an automobile battery.

Three mist-nets were set up in each of the three audio lure sites for a total of nine nets (Fig. 3). The Boreal Owl call, Northern Saw-whet Owl call and "no call" were rotated counter-

clockwise between the three audio sites (A, B and C). If less than three net hours were recorded because of inclement weather, that night was excluded from the rotation schedule. The remaining six mist nets were passive and were placed in the same sites as the spring nets.

Daily estimated totals (DETs) were determined for the spring period (15 March - 30 May) and fall (1 August - 13 November) using the above counts. WPBO's Spring Diurnal Raptor Count and Spring and Fall Waterbird Count totals are also included in the DET. Casual observations recorded outside of a standard count are also included. The count is by calendar day from midnight to midnight. The only exception being the owl banding results which are always grouped to the day when the nets are closed.

The final DET is determined by either summing counts from different censuses or by taking the highest totals from an individual census. Counters consider the actual dynamics of the migration when considering whether to add the counts or take the highest number. For example, if birds are seen coming to the Point and immediately flying-over the lake the observations for that species would be summed. However, if the birds are milling about the Point, and flocks of the same composition are seen over-and-over again, the highest single total would be recorded. This is done to avoid re-counting the same bird and to obtain the best reasonable estimate of the actual migration.

### **Vermilion:**

Spring 1996 (23 May - 28 June) and Fall 1996 (1 August - 30 September) -

Censusing usually begins at this site on 10 May but the road was impassable this year until 19 May due to snow. A daily census route was conducted within three hours of official sunrise to gather information on birds not captured in mist nets (Fig. 4). The census route encompassed most of the habitat types found at the site and followed the same methodology as explained in the Whitefish Point "Director's Census."

Passerine banding was also conducted in these periods to obtain a better estimate of the migration. We used 12 mist-nets in the spring and fall (Fig. 4). Nets were opened at official

sunrise and ran for six hours. All safety precautions for birds described for Whitefish Point were also used at Vermilion. Recaptures were recorded in the same manner as described for Whitefish Point to determine stopover times.

A DET was determined for Vermilion using census results, banding and "other than census" observations (birds seen or heard outside of the official census up until eight hours after sunrise). The results were combined in a manner similar to Whitefish Point's DET. All observers and banders at Vermilion were involved in compilation of the DET to prevent some birds from being counted more than once and to provide an accurate estimate of the migration (Hussell 1981, Hussell & Ralph 1996).

## **RESULTS**

### **Whitefish Point:**

Spring 1996 (15 March - 31 May) -

Few raptors were observed at Whitefish Point in March (Table 1). Numbers of birds increased in April and by the end of May most raptors had migrated through the Point. Large numbers of Sharp-shinned Hawk, Broad-winged Hawk, Red-tailed Hawk, Bald Eagle, Northern Harrier, Rough-legged Hawk and American Kestrel were counted (Table 1).

From 1 April through 31 May we banded 57 Boreal Owls, 40 Northern Saw-whet Owls, 12 Great Gray Owls, 12 Long-eared Owls, 5 Barred Owls and 1 Great Horned Owl. There were only 2 recaptures (Table 2). One was a Northern Saw-whet Owl that was banded in Wisconsin in 1995. We also recaptured a Boreal Owl on 21 May that we banded 9 days earlier.

Neotropical migrants began passing through the Point in April but all species migrated more heavily in May (Table 1). Neotropical migrants recorded in highest numbers were: Ruby-throated Hummingbird, Tree Swallow, Cliff Swallow, Barn Swallow, Ruby-crowned Kinglet, Eastern Bluebird, Hermit Thrush, Western Palm Warbler, Chipping Sparrow and Bobolink. Other

neotropical migrant warblers of which we recorded more than 10 individuals were: Nashville Warbler, Magnolia Warbler, Cape May Warbler, Black-throated Green Warbler, Black-and-white Warbler, American Redstart, Ovenbird and Wilson's Warbler (Table 1).

Fall 1996 (1 August - 13 November) -

Whitefish Point does not receive a large migration of diurnal raptors in the Fall. The only species of which we recorded more than 50 individuals were Bald Eagle and Merlin (Table 2). We documented large numbers of Boreal Owl (183) and Northern Saw-whet Owl (55). We observed 15 Snowy Owls in the first half of November (Table 2).

From 23 September to 31 October we captured 170 Boreal Owls, 54 Northern Saw-whet Owls, 1 Long-eared Owl, 1 Barred Owl and 1 Northern Hawk Owl. There were 12 recaptures of Boreal Owls. Mean stopover time for Boreal Owls was 5.7 days (Table 3).

Neotropical migrants passed through the Point on their southward migration from August through October (Table 3). Heaviest flights for most species were recorded in September. Neotropical migrants observed in highest numbers were Ruby-throated Hummingbird, Barn Swallow, Ruby-crowned Kinglet, Swainson's Thrush, Hermit Thrush, Solitary Vireo, Red-eyed Vireo, Tennessee Warbler, Nashville Warbler, Magnolia Warbler, Cape May Warbler, Black-throated Green Warbler, Western Palm Warbler, Blackpoll Warbler, Black-and-white Warbler, American Redstart, Northern Waterthrush, Common Yellowthroat, Chipping Sparrow, and Lincoln's Sparrow (Table 3).

We banded 2819 birds of 62 species at our passerine banding site. Of these birds, 113 individuals of 20 species were recaptured (Table 2). Stopover time ranged from 1 to 45 days. Five individuals were recaptured that were banded at WPBO in 1995. One bird was recaptured on 16 August that had been originally banded on 23 May at Vermilion.

## **Vermilion:**

Spring 1996 (23 May - 28 June) -

From 23 May through 28 June we recorded 43 diurnal raptors of 7 species. Species seen most often were Merlin, Sharp-shinned Hawk, Osprey, Northern Harrier and Bald Eagle (Table 4). We also documented 4 Northern Saw-whet Owls. No raptors were captured in mist-nets.

By the time we could get out to Vermilion the migration was well underway. Waterbirds seen most often were Common Loon, American Bittern, Canada Goose, Mallard, Common Merganser, Common Snipe and Herring Gull (Table 4). Most common neotropical migrants were Ruby-throated Hummingbird, Red-eyed Vireo, Nashville Warbler, Yellow Warbler, Magnolia Warbler, Black-and-white Warbler, American Redstart, Common Yellowthroat and Wilson's Warbler (Table 4).

We captured and banded a total of 1081 birds of 53 species. Thirty-three (62.3%) were neotropical migrants, 19 (35.8%) were short distance migrants and 1 was a resident species. We recaptured 66 birds of 16 species at least once in the Spring migration (Table 5). Stopover time ranged from 1 - 23 days with the mean varying among species. Birds most commonly recaptured were Black-capped Chickadee, Traill's flycatcher, American Redstart and Song Sparrow.

Fall 1996 (1 August - 30 September) -

Diurnal raptors most often seen were Bald Eagle, Merlin, Sharp-shinned Hawk, Northern Harrier, Rough-legged Hawk and Osprey (Table 4). Two sharp-shinned hawks were banded. In August, 4 Northern Saw-whet Owls were documented. Most common waterbirds were Common Loon, American Bittern, Canada Goose, Sandhill Crane and Herring Gull.

Neotropical migrants passed through Vermilion in both August and September. More birds were recorded in September than August. Migrants recorded in highest numbers were Swainson's Thrush, Red-eyed Vireo, Tennessee Warbler, Nashville Warbler, Yellow Warbler, Magnolia



Warbler, Black-throated Green Warbler, Blackpoll Warbler, Black-and-white Warbler, American Redstart and Common Yellowthroat.

A total of 1817 birds of 63 species were banded. Forty (63.5%) species were neotropical migrants, 21 (33.3%) were short distance migrants and 2 were resident species. We recaptured 142 birds of 29 species in the fall migration (Table 5). Stopover time ranged from 1 - 50 days with the mean varying among species. Neotropical migrants such as warblers and vireos had the widest range of stopover times. Short distance migrants such as sparrows and waxwings generally had longer stopover times.

## DISCUSSION

Migration routes and concentration areas of birds are generally thought to be determined by topographical features. These constraining limits are termed leading lines. Migrant landbirds typically avoid open water because of the possibility of running out of energy or the lack of thermal updrafts necessary to sustain prolonged flight. Nocturnal migrant landbirds, migrating along a broad front, are constricted by the leading lines of coastlines and are subsequently concentrated at various migration funnels in the day (Scharf et al 1979). This causes the concentration of birds at Whitefish Point in the spring migration. In the fall, southbound landbirds follow similar leading lines or are caught over Lake Superior and are drawn to the nearest point of land (i.e. Whitefish Point).

This effect has been recognized for many years, but only recently have conservation organizations began to study the importance of shoreline habitats to migrants. Other studies conducted in the Great Lakes Region also indicate a higher use of shoreline areas by migrating landbirds (Ewert and Hamas 1995, Scharf et al 1979). Most Great Lakes bird observatories are located on shorelines and peninsulas (Whitefish Point Bird Observatory, Long Point Bird Observatory, Thunder Cape Bird Observatory, Holiday Beach Migration Association, Black Swamp Bird Observatory, Hawk Ridge, etc.) due to their concentrations of migrating birds.

Johansen et al (1995) found that migratory bird use was highest along the Lake Superior and Whitefish Bay shorelines versus inland areas. The results of this year's research further document the importance of the Lake Superior shoreline and Whitefish Point to migrating birds. Stopover times of migrating birds at Vermilion and Whitefish Point indicate that they remain in the study areas for several days. Flocks of migrants are commonly seen foraging on insects and berries at both sights (pers. obs.). Ewert and Hamas (1995) found the highest neotropical migrant densities along the Lake Huron shoreline which produces large numbers of midges.

This year's results and research previously conducted by WPBO indicate a need for shoreline habitat protection on the Whitefish Peninsula. Habitat degradation could result in mortality of birds in migration due to lack of foraging areas and insufficient cover to evade predation. A migratory bird reserve area should be established on the Whitefish Peninsula. Timber harvest and development plans within this area should be carefully scrutinized by Michigan Department of Natural Resources biologists.

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Table 1. Daily Estimated Totals, monthly and seasonal, of birds censused and banded at Whitefish Point, Chippewa County, Michigan, Spring 1996.

	MARCH	APRIL	MAY	TOTAL
SPECIES	DET	DET	DET	DET
Turkey Vulture	0	26	114	140
Osprey	0	13	118	131
Mississippi Kite	0	0	2	2
Bald Eagle	44	116	58	218
Northern Harrier	0	155	175	330
Sharp-shinned Hawk	0	846	5980	6826
Cooper's Hawk	0	13	29	42
Northern Goshawk	8	34	28	70
Red-shouldered Hawk	0	6	6	12
Broad-winged Hawk	0	57	3578	3635
Swainson's Hawk	0	1	1	2
Red-tailed Hawk	11	334	443	788
Rough-legged Hawk	2	96	128	226
Golden Eagle	1	18	12	31
American Kestrel	1	238	219	458
Merlin	0	33	64	97
Peregrine Falcon	0	4	44	48
Ruffed Grouse	2	9	13	24
Sharp-tailed Grouse	0	1	2	3
Virginia Rail	0	0	1	1
Sandhill Crane	0	566	370	936
Common Snipe	0	4	2	6
American Woodcock	0	0	3	3
Rock Dove	0	1	5	6
Mourning Dove	2	44	31	77
Great Horned Owl	0	2	6	8
Northern Hawk-Owl	0	1	5	6
Barred Owl	0	1	5	6
Great Gray Owl	0	2	26	28
Long-eared Owl	0	10	22	32
Short-eared Owl	0	3	0	3
Boreal Owl	0	19	42	61
Northern Saw-whet Owl	0	11	30	41
Common Nighthawk	0	0	9	9
Whip-poor-will	0	0	2	2
Chimney Swift	0	0	43	43
Ruby-throated Hummingbird	0	0	31	31
Belted Kingfisher	0	9	29	38
Red-headed Woodpecker	0	0	1	1
Red-bellied Woodpecker	0	0	3	3
Yellow-bellied Sapsucker	0	3	3	6
Downy Woodpecker	0	5	3	8
Hairy Woodpecker	1	0	18	19
Black-backed Woodpecker	0	0	1	1
Northern Flicker	0	100	329	429
Pileated Woodpecker	1	9	30	40
Alder Flycatcher	0	0	4	4
Least Flycatcher	0	0	23	23
Eastern Phoebe	0	15	8	23
Western Kingbird	0	0	1	1
Eastern Kingbird	0	0	23	23
Horned Lark	0	1	22	23
Tree Swallow	0	46	208	254
Northern Rough-winged Swallow	0	0	21	21

Table 1 (Cont'd). Daily Estimated Totals, monthly and seasonal, of birds censused and banded at Whitefish Point, Chippewa County, Michigan, Spring 1996.

	MARCH	APRIL	MAY	TOTAL
SPECIES	DET	DET	DET	DET
Bank swallow	0	0	12	12
Cliff Swallow	0	1	113	114
Barn Swallow	0	0	92	92
Blue Jay	0	2	6059	6061
American Crow	86	252	138	476
Common Raven	80	255	125	460
Black-capped Chickadee	57	134	1434	1625
Boreal Chickadee	0	0	4	4
Red-breasted Nuthatch	0	0	39	39
White-breasted Nuthatch	0	1	10	11
Brown Creeper	0	12	18	30
House Wren	0	0	1	1
Winter Wren	0	2	2	4
Marsh Wren	0	0	2	2
Golden-crowned Kinglet	0	26	14	40
Ruby-crowned Kinglet	0	4	68	72
Blue-gray Gnatcatcher	0	0	1	1
Eastern Bluebird	0	1	44	45
Veery	0	0	2	2
Gray-cheeked Thrush	0	0	2	2
Swainson's Thrush	0	0	5	5
Hermit Thrush	0	12	21	33
Wood Thrush	0	0	2	2
American Robin	4	951	447	1402
Gray Catbird	0	0	3	3
Northern Mockingbird	0	0	7	7
Brown Thrasher	0	0	13	13
American Pipit	0	1	72	73
Bohemian Waxwing	10	257	19	286
Cedar Waxwing	0	1	11	12
Northern Shrike	0	6	0	6
European Starling	13	96	120	229
Solitary Vireo	0	0	3	3
Philadelphia Vireo	0	0	6	6
Red-eyed Vireo	0	0	2	2
Tennessee Warbler	0	0	5	5
Orange-crowned Warbler	0	0	9	9
Nashville Warbler	0	0	23	23
Northern Parula	0	0	4	4
Yellow Warbler	0	0	5	5
Chestnut-sided Warbler	0	0	7	7
Magnolia Warbler	0	0	16	16
Cape May Warbler	0	0	21	21
Black-throated Blue Warbler	0	0	5	5
Myrtle Warbler	0	7	151	158
Townsend's Warbler	0	0	1	1
Black-throated Green Warbler	0	0	15	15
Blackburnian Warbler	0	0	7	7
Pine Warbler	0	0	5	5
Western Palm Warbler	0	0	61	61
Bay-breasted Warbler	0	0	7	7
Blackpoll Warbler	0	0	4	4
Black-and-white Warbler	0	0	18	18
American Redstart	0	0	12	12

Table 1 (Cont'd). Daily Estimated Totals, monthly and seasonal, of birds censused and banded at Whitefish Point, Chippewa County, Michigan, Spring 1996.

	MARCH	APRIL	MAY	TOTAL
SPECIES	DET	DET	DET	DET
Ovenbird	0	0	11	11
Northern Waterthrush	0	0	1	1
Connecticut Warbler	0	0	1	1
Common Yellowthroat	0	0	8	8
Hooded Warbler	0	0	1	1
Wilson's Warbler	0	0	15	15
Canada Warbler	0	0	5	5
Scarlet Tanager	0	0	6	6
Rose-breasted Grosbeak	0	1	23	24
Indigo Bunting	0	0	5	5
Dicksissel	0	0	1	1
American Tree Sparrow	0	98	72	170
Chipping Sparrow	0	12	359	371
Clay-colored Sparrow	0	0	27	27
Field Sparrow	0	0	1	1
Vesper Sparrow	0	10	14	24
Savannah Sparrow	0	3	21	24
Le Conte's Sparrow	0	0	3	3
Fox Sparrow	0	11	6	17
Song Sparrow	0	111	59	170
Lincoln's Sparrow	0	1	20	21
Swamp Sparrow	0	5	6	11
White-throated Sparrow	0	14	375	389
White-crowned Sparrow	0	0	208	208
Dark-eyed Junco	4	486	491	981
Lapland Longspur	0	13	25	38
Smith's Longspur	0	0	3	3
Snow Bunting	0	158	433	591
Bobolink	0	0	35	35
Red-winged Blackbird	0	278	109	387
Eastern Meadowlark	0	1	6	7
Western Meadowlark	0	0	1	1
Yellow-headed Blackbird	0	0	1	1
Rusty Blackbird	0	0	86	86
Common Grackle	2	485	1165	1652
Brown-headed Cowbird	0	606	670	1276
Northern Oriole	0	0	19	19
Pine Grosbeak	553	63	1	617
Purple Finch	0	16	186	202
House Finch	9	21	15	45
Red Crossbill	2	15	0	17
White-winged Crossbill	0	0	1	1
Common Redpoll	1536	3097	303	4936
Hoary Redpoll	4	6	0	10
Pine Siskin	0	161	600	761
American Goldfinch	1	0	182	183
Evening Grosbeak	0	6	1192	1198
House Sparrow	0	0	9	9

Table 2. Species recaptured and stopover times of birds banded at Whitefish Point, Chippewa County, Michigan, Spring and Fall 1996.

SPECIES	SPRING		FALL	
	NUMBER OF RECAPTURES <sup>A</sup>	MEAN STOPOVER TIME (+/-SD)	NUMBER OF RECAPTURES <sup>A</sup>	MEAN STOPOVER TIME (+/-SD)
Boreal Owl	1	NC	12	5.7 (3.9)
Northern Saw-whet Owl	1	NC	2	NC
Black-capped Chickadee			2	NC
Ruby-crowned Kinglet			1	NC
Gray-cheeked Thrush			3	1.7 (0.8)
Swainson's Thrush			1	NC
Cedar Waxwing			3	12.0 (3.5)
Tennessee Warbler			2	NC
Nashville Warbler			53	7.4 (3.1)
Cape May Warbler			1	NC
Magnolia Warbler			3	5.3 (2.7)
Myrtle Warbler			6	8.0 (2.8)
Western Palm Warbler			1	NC
Blackpoll Warbler			2	NC
Common Yellowthroat			9	13.7 (3.3)
Northern Waterthrush			1	NC
White-throated Sparrow			6	15.5 (3.6)
White-crowned Sparrow			1	NC
Lincoln's Sparrow			4	1.0 (0.0)
Swamp Sparrow			3	6.3 (2.2)
Chipping Sparrow			2	NC
Purple Finch			2	NC

<sup>A</sup>Each individual was counted only once, although there were multiple recaptures of some birds.

<sup>B</sup>Unable to calculate stopover time due to only 1-2 recaptured individuals.



Table 3. Daily Estimated Totals, monthly and seasonal, of birds censused and banded at Whitefish Point, Chippewa County, Michigan, Fall 1996.

SPECIES	AUGUST DET	SEPTEMBER DET	OCTOBER DET	NOVEMBER DET	TOTAL DET
Turkey Vulture	1	0	1	0	2
Osprey	1	15	1	0	17
Bald Eagle	9	16	27	9	61
Northern Harrier	24	4	8	0	36
Sharp-shinned Hawk	27	15	6	0	48
Cooper's Hawk	3	0	0	0	3
Northern Goshawk	11	10	9	0	30
Red-shouldered Hawk	0	0	0	0	0
Broad-winged Hawk	42	7	0	0	49
Swainson's Hawk	0	0	0	0	0
Red-tailed Hawk	14	5	5	0	24
Rough-legged Hawk	1	6	24	5	36
Golden Eagle	0	0	0	0	0
American Kestrel	4	9	6	0	19
Merlin	19	30	19	1	69
Peregrine Falcon	2	15	13	0	30
Spruce Grouse	0	0	1	1	2
Ruffed Grouse	0	0	26	2	28
Sharp-tailed Grouse	0	0	0	0	0
Yellow Rail	0	1	0	0	1
Virginia Rail	0	0	0	0	0
Sora	0	10	0	0	10
Sandhill Crane	37	27	0	0	64
Common Snipe	0	9	31	0	40
American Woodcock	0	0	1	0	1
Rock Dove	1	1	0	0	2
Mourning Dove	22	10	2	0	34
Black-billed Cuckoo	0	0	3	0	3
Yellow-billed Cuckoo	0	1	0	0	1
Snowy Owl	0	0	0	15	15
Great Horned Owl	0	0	0	0	0
Northern Hawk-Owl	0	3	3	2	8
Barred Owl	0	0	1	0	1
Great Gray Owl	0	0	0	0	0
Long-eared Owl	1	0	1	0	2
Short-eared Owl	0	1	2	0	3
Boreal Owl	0	40	143	0	183
Northern Saw-whet Owl	0	13	42	0	55
Common Nighthawk	1	0	0	0	1
Whip-poor-will	0	0	0	0	0
Chimney Swift	0	0	3	0	3
Ruby-throated Hummingbird	27	14	0	0	41
Belted Kingfisher	3	6	0	1	10
Red-headed Woodpecker	0	0	2	0	2
Red-bellied Woodpecker	0	0	1	0	1
Yellow-bellied Sapsucker	0	1	2	0	3
Downy Woodpecker	1	7	14	4	26
Hairy Woodpecker	0	0	7	1	8
Black-backed Woodpecker	1	4	8	0	13
Northern Flicker	1	14	22	1	38
Pileated Woodpecker	0	0	4	1	5
Eastern Wood-pewee	5	6	0	0	11
Yellow-bellied Flycatcher	7	0	0	0	7
Alder Flycatcher	10	0	0	0	10
Least Flycatcher	10	2	0	0	12
Eastern Phoebe	0	0	0	0	0
Western Kingbird	0	0	2	0	2

Table 3 (Cont'd). Daily Estimated Totals, monthly and seasonal, of birds censused and banded at Whitefish Point, Chippewa County, Michigan, Fall 1996.

SPECIES	AUGUST DET	SEPTEMBER DET	OCTOBER DET	NOVEMBER DET	TOTAL DET
Eastern Kingbird	0	3	0	0	4
Scissor-tailed flycatcher	0	0	2	0	2
Horned Lark	0	1006	350	27	1383
Tree Swallow	0	0	0	0	0
Northern Rough-winged Swallow	2	7	0	0	9
Bank Swallow	5	0	0	0	5
Cliff Swallow	0	18	7	0	25
Barn Swallow	36	25	0	0	61
Blue Jay	5	134	373	75	587
American Crow	27	118	81	3	229
Common Raven	29	42	129	41	241
Black-capped Chickadee	72	70	175	27	344
Boreal Chickadee	0	0	0	0	0
Red-breasted Nuthatch	53	81	114	6	254
White-breasted Nuthatch	8	5	0	0	13
Brown Creeper	4	14	38	3	59
House Wren	0	0	0	0	0
Winter Wren	0	6	9	0	15
Marsh Wren	0	1	0	0	1
Golden-crowned Kinglet	10	84	119	11	224
Ruby-crowned Kinglet	1	26	41	3	71
Blue-gray Gnatcatcher	2	19	70	6	97
Eastern Bluebird	0	0	0	1	0
Townsend's Solitaire	0	0	1	4	5
Veery	0	0	0	0	0
Gray-cheeked Thrush	1	14	2	0	17
Swainson's Thrush	10	25	1	0	36
Hermit Thrush	3	16	34	1	54
Wood Thrush	0	0	0	0	0
American Robin	24	30	153	25	232
Gray Catbird	0	4	1	0	5
Northern Mockingbird	0	0	0	0	0
Brown Thrasher	0	0	0	0	0
American Pipit	0	261	15	0	276
Bohemian Waxwing	0	0	15	37	52
Cedar Waxwing	258	642	56	13	969
Northern Shrike	0	0	10	2	12
European Starling	0	0	11	17	28
Solitary Vireo	6	17	4	0	27
Philadelphia Vireo	2	7	0	0	9
Red-eyed Vireo	25	28	0	0	53
Blue-winged Warbler	0	0	0	0	0
Tennessee Warbler	66	64	0	0	130
Orange-crowned Warbler	0	4	0	0	4
Nashville Warbler	507	367	5	0	879
Northern Parula	1	7	0	0	8
Yellow Warbler	5	0	0	0	5
Chestnut-sided Warbler	13	10	1	0	24
Magnolia Warbler	17	35	0	0	52
Cape May Warbler	16	22	0	0	38
Black-throated Blue Warbler	8	17	0	0	25
Myrtle Warbler	349	1436	156	1	1942
Townsend's Warbler	0	0	0	0	0
Black-throated Green Warbler	21	75	3	0	99
Blackburnian Warbler	10	6	0	0	16
Pine Warbler	0	4	0	0	4
Western Palm Warbler	15	98	46	0	159

Table 3 (Cont'd). Daily Estimated Totals, monthly and seasonal, of birds censused and banded at Whitefish Point, Chippewa County, Michigan, Fall 1996.

	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	TOTAL
SPECIES	DET	DET	DET	DET	DET
Bay-breasted Warbler	7	6	0	0	13
Blackpoll Warbler	11	40	1	0	52
Black-and-white Warbler	14	14	0	0	28
American Redstart	31	28	2	0	61
Ovenbird	1	8	1	0	10
Northern Waterthrush	24	8	0	0	32
Connecticut Warbler	0	1	0	0	1
Mourning Warbler	4	0	0	0	4
Common Yellowthroat	80	175	4	0	259
Wilson's Warbler	7	9	0	0	16
Canada Warbler	7	1	0	0	8
Scarlet Tanager	0	1	0	0	1
Rose-breasted Grosbeak	0	0	0	0	0
Indigo Bunting	1	2	1	0	4
Dickcissel	0	2	1	0	3
Rufous-sided Towhee	0	0	3	0	3
American Tree Sparrow	0	0	111	77	188
Chipping Sparrow	109	18	5	0	132
Clay-colored Sparrow	0	3	26	0	29
Field Sparrow	1	1	0	1	3
Vesper Sparrow	1	1	0	0	2
Savannah Sparrow	0	49	5	0	54
Le Conte's Sparrow	0	3	2	0	5
Fox Sparrow	0	4	10	0	14
Song Sparrow	21	47	20	2	90
Lincoln's Sparrow	1	49	18	0	68
Swamp Sparrow	12	34	49	6	101
White-throated Sparrow	65	179	139	7	390
White-crowned Sparrow	19	130	125	1	275
Dark-eyed Junco	4	67	312	31	414
Lapland Longspur	0	91	127	4	222
Smith's Longspur	0	0	0	0	0
Snow Bunting	0	0	500	279	779
Bobolink	0	0	0	0	0
Red-winged Blackbird	0	0	0	3	3
Eastern Meadowlark	0	0	0	0	0
Western Meadowlark	0	0	0	0	0
Yellow-headed Blackbird	0	0	0	0	0
Rusty Blackbird	0	34	70	2	106
Common Grackle	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0
Northern Oriole	0	0	0	0	0
Pine Grosbeak	0	0	0	1	1
Purple Finch	77	151	602	43	873
House Finch	0	0	4	0	4
Red Crossbill	34	14	105	23	176
White-winged Crossbill	2	2	11	0	15
Common Redpoll	0	0	5	8	13
Hoary Redpoll	0	0	0	0	0
Pine Siskin	174	527	3617	48	4366
American Goldfinch	164	21	136	260	581
Evening Grosbeak	147	0	507	317	971
House Sparrow	0	1	2	0	3

Table 4. Daily Estimated Totals, monthly and seasonal, of birds censused and banded at Vermilion, Chippewa County, Michigan, Spring and Fall 1996.

SPECIES	SPRING DET 5/23-6/28	AUGUST	SEPTEMBER	FALL DET TOTAL
Common Loon	81	14	73	87
Red-necked Grebe		15	6	21
Double-crested Cormorant	14	2	10	12
American Bittern	16	25	11	36
Least Bittern	2			
Great Blue Heron	7			
Canada Goose	330	14	423	437
Mallard	19	6	15	21
Blue-winged Teal			5	5
Common Merganser	66		8	8
Red-breasted Merganser	6		9	9
Turkey Vulture			1	1
Osprey	5	5		5
Bald Eagle	4	1	19	20
Northern Harrier	5	5	1	6
Sharp-shinned Hawk	11	3	4	7
Cooper's Hawk		2		2
Red-shouldered Hawk	1			
Rough-legged Hawk		6		6
American Kestrel	1	2		2
Merlin	16	2	15	17
Peregrine Falcon		1		1
Ruffed Grouse	11	8	1	9
Virginia Rail	6			
Sandhill Crane	41	58	42	100
Piping Plover	2			
Black-bellied Plover			3	3
Killdeer	5			
Greater Yellowlegs			5	5
Lesser Yellowlegs		1		1
Solitary Sandpiper	1			
Sanderling		8	4	12
Semipalmated Sandpiper		1		1
Common Snipe	19			
Bonaparte's Gull			5	5
Ring-billed Gull	3			
Herring Gull	67	23	187	210
Caspian Tern	3			
Rock Dove	1			
Mourning Dove	5			
Black-billed Cuckoo	2			
Northern Saw-whet Owl	4	4		4
Common Nighthawk	2	2		2
Whip-poor-will				
Chimney Swift	3	15		15
Ruby-throated Hummingbird	41	16	2	18
Belted Kingfisher	6	9	15	24
Red-headed Woodpecker		1		1

Table 4 (Cont'd). Daily Estimated Totals, monthly and seasonal, of birds censused and banded at Vermilion, Chippewa County, Michigan, Spring and Fall 1996.

SPECIES	SPRING DET	AUGUST	SEPTEMBER	FALL DET
	5/23-6/28			TOTAL
Yellow-bellied Sapsucker	1			
Downy Woodpecker		17	9	26
Hairy Woodpecker	3	12	9	21
Black-backed Woodpecker	1			
Northern Flicker	20		2	2
Pileated Woodpecker	1			
Eastern Wood-pewee	2	1		1
Yellow-bellied Flycatcher	21	6	2	8
Traill's Flycatcher	192	18		18
Alder Flycatcher	17		7	7
Least Flycatcher	37	10	3	13
Eastern Phoebe	39	2		2
Great-crested Flycatcher	3			
Eastern Kingbird	9			
Horned Lark			250	250
Tree Swallow	13			
Northern-rough-winged Swallow	2			
Barn Swallow	17	3		3
Blue Jay	1356	3	25	28
American Crow	55	45	60	105
Common Raven	5	12	84	96
Black-capped Chickadee	566	55	60	115
Red-breasted Nuthatch	15	40	89	129
Brown Creeper		1	4	5
Winter Wren			1	1
Sedge Wren	3		1	1
Golden-crowned Kinglet	2	1	33	34
Ruby-crowned Kinglet	4	6	4	10
Eastern Bluebird	14			
Veery	2			
Gray-cheeked Thrush		1	12	13
Swainson's Thrush	6	1	24	25
Hermit Thrush	2	1	21	22
American Robin	19	33	9	42
Gray Catbird	1		1	1
Northern Mockingbird	4			
Brown Thrasher	1			
Cedar Waxwing	268	262	144	406
European Starling	17			
Solitary Vireo		2	10	12
Philadelphia Vireo	10		2	2
Red-eyed Vireo	85	43	61	104
Tennessee Warbler	4	28	41	69
Orange-crowned Warbler	2			
Nashville Warbler	95	230	329	559
Northern Parula	2		3	3
Yellow Warbler	64	26	2	28
Chestnut-sided Warbler	28	2	2	4

Table 4 (Cont'd). Daily Estimated Totals, monthly and seasonal, of birds censused and banded at Vermillion, Chippewa County, Michigan, Spring and Fall 1996.

SPECIES	SPRING DET 5/23-6/28	AUGUST	SEPTEMBER	FALL DET TOTAL
Magnolia Warbler	45	26	24	50
Cape May Warbler		2	5	7
Black-throated Blue Warbler	6	4	7	11
Myrtle Warbler	65	91	257	348
Black-throated Green Warbler	23	17	65	82
Blackburnian Warbler		6	5	11
Pine Warbler		1	1	2
Western Palm Warbler	5	1	11	12
Bay-breasted Warbler			3	3
Blackpoll Warbler	6	6	49	55
Black-and-white Warbler	55	28	8	36
American Redstart	88	63	16	79
Ovenbird	1	4	5	9
Northern Waterthrush	1	7	1	8
Connecticut Warbler	3			
Mourning Warbler	12	1		1
Common Yellowthroat	114	105	150	255
Yellow-breasted Chat			1	1
Wilson's Warbler	50	17	7	24
Canada Warbler	22	9	8	17
Scarlet Tanager			1	1
Rose-breasted Grosbeak	3	1		1
American Tree Sparrow	1			
Chipping Sparrow	23	4	1	5
Clay-colored Sparrow		1		1
Vesper Sparrow		1		1
Savannah Sparrow	17	47		39
Song Sparrow	51	37	9	46
Lincoln's Sparrow	2	1	18	19
Swamp Sparrow	57	83	73	156
White-throated Sparrow	12	36	61	97
White-crowned Sparrow			8	8
Dark-eyed Junco			8	8
Lapland Longspur			6	6
Red-winged Blackbird	65	4		4
Western Meadowlark	3			
Common Grackle	13			
Brown-headed Cowbird	7			
Northern Oriole	1			
Purple Finch	13	156	87	243
Red Crossbill		11		11
White-winged Crossbill	1	5	1	6
Pine Siskin	29		1	1
American Goldfinch	154	26	5	31
Evening Grosbeak	181		5	5
House Sparrow	1			

Table 5. Species recaptured and stopover times of birds banded at Vermilion, Chippewa County, Michigan, Spring and Fall 1996.

SPECIES	SPRING		FALL	
	NUMBER OF RECAPTURES <sup>A</sup>	MEAN STOPOVER TIME (+/-SD)	NUMBER OF RECAPTURES <sup>A</sup>	MEAN STOPOVER TIME (+/-SD)
Downy Woodpecker			2	NC
Hairy Woodpecker			1	NC
Trail's Flycatcher	5	5.0 (3.6)	1	NC
Least Flycatcher	1	NC <sup>B</sup>		
Eastern Phoebe	2	NC		
Black-capped Chickadee	37	6.1 (5.9)	5	17.8 (13.2)
Red-breasted Nuthatch			2	NC
Gray-cheeked Thrush			1	NC
Swainson's Thrush	1	NC		
Cedar Waxwing			3	16.3 (13.3)
Red-eyed Vireo	2	NC	3	5 (4.4)
Tennessee Warbler			3	12 (8.9)
Nashville Warbler	1	NC	23	6.2 (7.5)
Black-and-white Warbler			4	3.8 (2.8)
Chestnut-sided Warbler			1	NC
Magnolia Warbler	1	NC	5	2.8 (1.5)
Myrtle Warbler	2	NC	1	NC
Black-throated Green Warbler			1	NC
Blackpoll Warbler			1	NC
Yellow Warbler	2	NC	7	2.9 (1.1)
Canada Warbler	1	NC	3	4.3 (4.9)
Wilson's Warbler	2	NC	2	NC
Ovenbird			1	NC
Common Yellowthroat	2	NC	27	11.0 (8.3)
American Redstart	5	13.8 (7.4)	9	4.9 (3.0)
Savannah Sparrow			1	NC
Song Sparrow	4	12.8 (5.6)	6	7.3 (9.3)
White-throated Sparrow			6	12.7 (15.9)
White-crowned Sparrow			1	NC
Lincoln's Sparrow			2	NC
Swamp Sparrow			17	22.6 (17.2)
Purple Finch			3	2 (0.0)

<sup>A</sup>Each individual was counted only once, although there were multiple recaptures of some birds.

<sup>B</sup>Unable to calculate stopover time due to only 1-2 recaptured individuals.

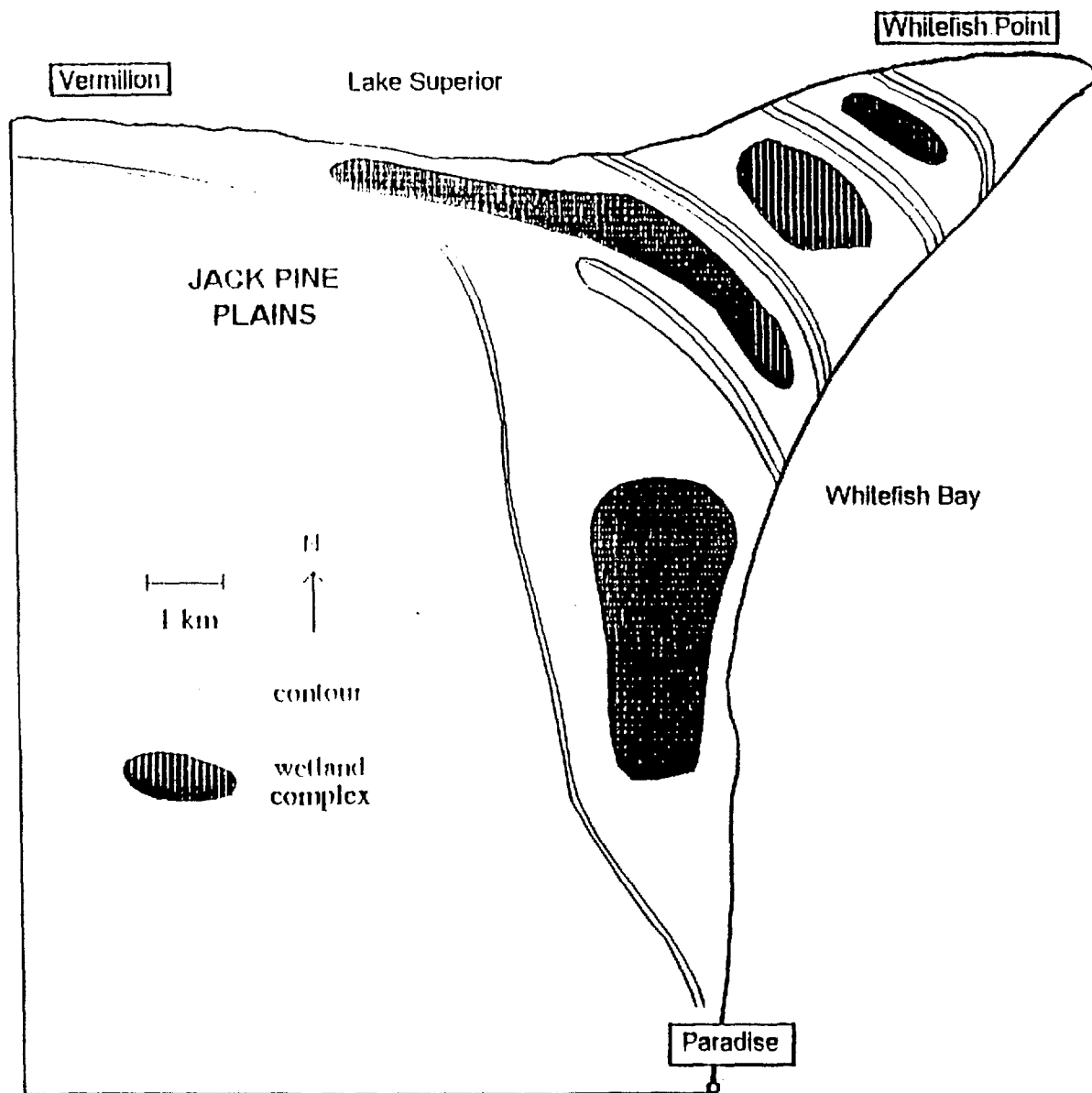
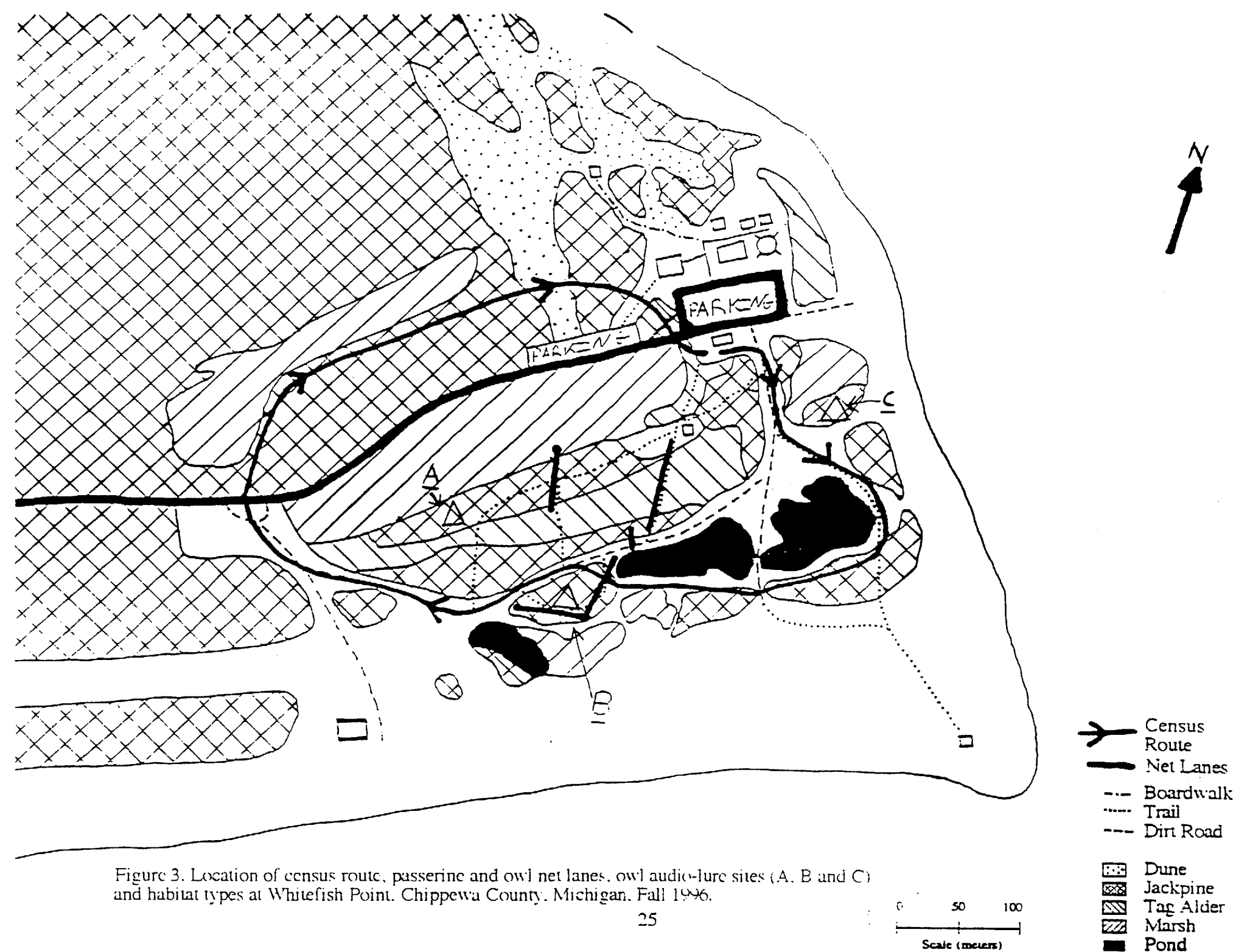
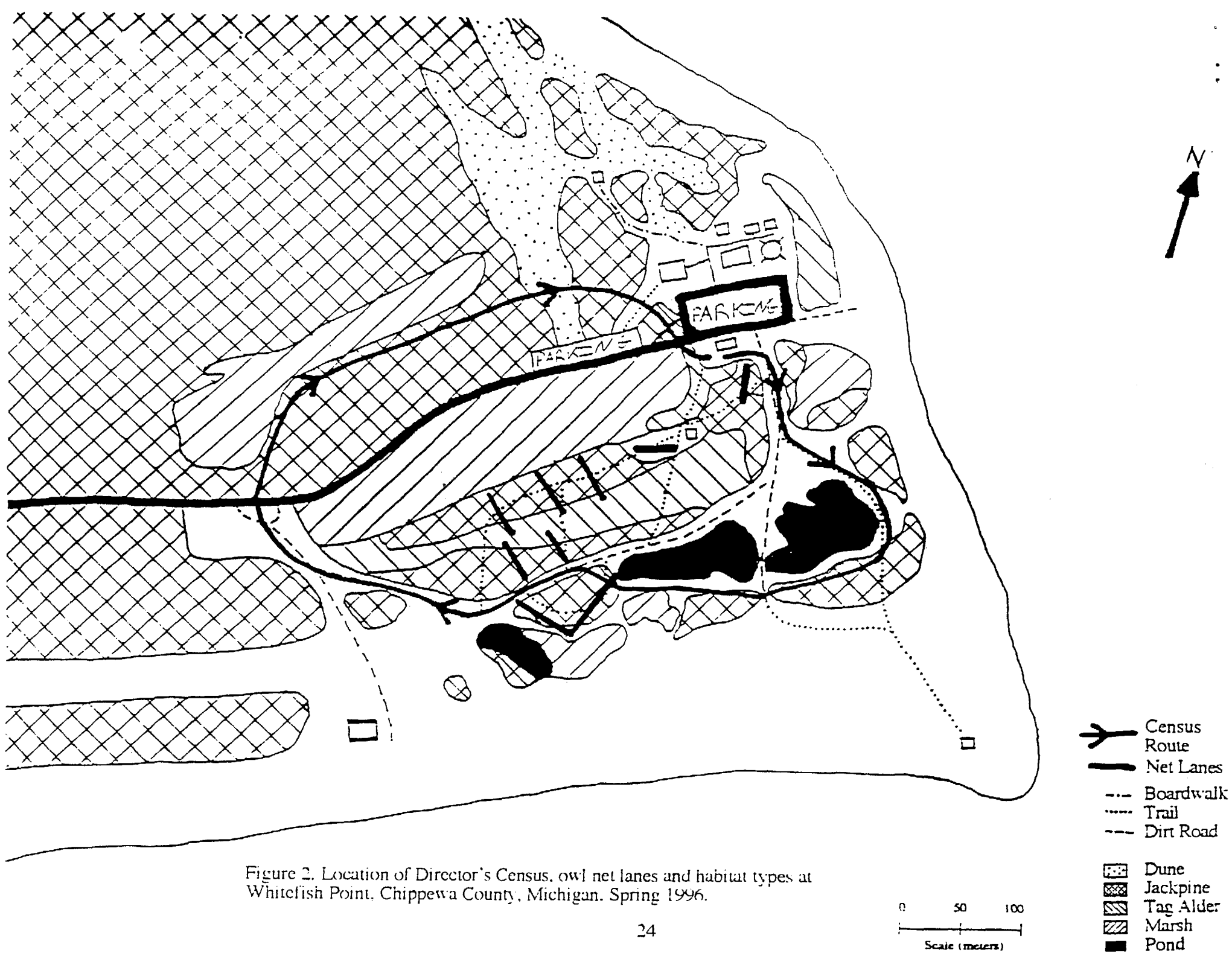


Figure 1. Location of Whitefish Point and Vermilion and general contour and major wetland complexes on Whitefish Peninsula, Chippewa County, Michigan.







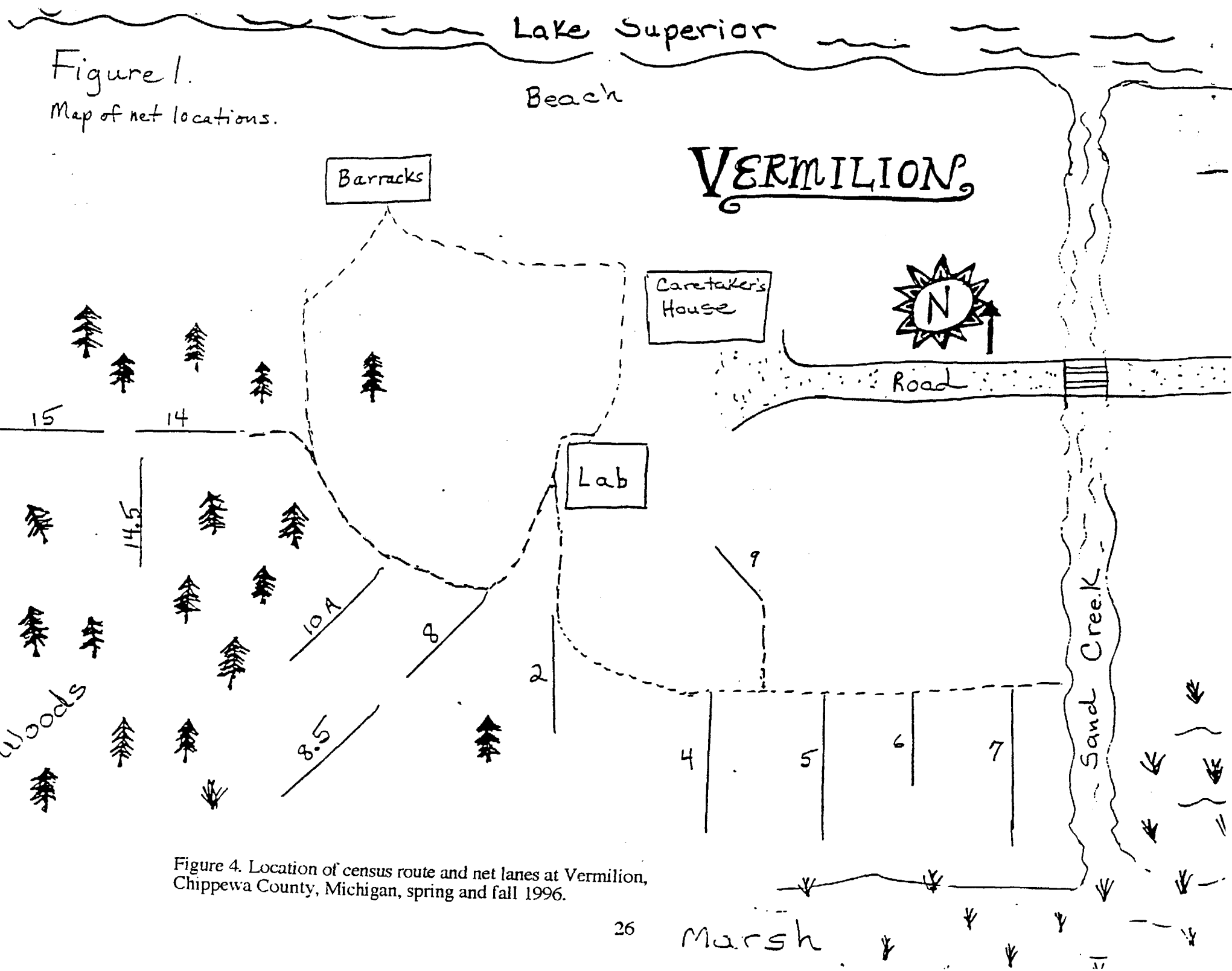


Figure 4. Location of census route and net lanes at Vermilion, Chippewa County, Michigan, spring and fall 1996.